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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/710,344

07/02/2004

Ming-Lun Ho

10796-US-PA

4343

31561

7590

03/28/2005

EXAMINER

QUINTO, KEVIN V

JIANQ CHYUN INTELLECTUAL PROPERTY OFFICE

7 FLOOR-1, NO. 100

ROOSEVELT ROAD, SECTION 2

TAIPEI, 100

TAIWAN

ART UNIT

PAPER NUMBER

2826

DATE MAILED: 03/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/710,344	HO ET AL.	
	Examiner	Art Unit	
	Kevin Quinto	2826	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 November 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 10-15, 17 and 18 is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☒ Claim(s) 16 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 July 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Specification

1. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Claim Objections

2. Claim 16 is objected to because of the following informalities: the claim does not have a period to end it. Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 3, 4, 5, 6, and 7 are rejected under 35 U.S.C. 102(b) as being anticipated by Zhang et al. (United States Patent Application No US 2002/0171144 A1).
5. In reference to claim 1, Zhang et al. (United State Patent Application No US 2002/0171144 A1, hereinafter referred to as the "Zhang" reference) discloses a similar device. Figure 10 of Zhang discloses a chip package structure with a substrate (104) which has an upper surface and a lower surface. There is a chip (102) with an active surface and a back surface. The active surface of the chip (102) is mounted to the

upper surface of the substrate (104). A stiffener (502) is on the upper surface of the substrate (104) and around the chip (102). A first heat sink (1002) is disposed on the back surface of the chip (102) and the stiffener (502). A second heat sink (504) is disposed on the lower surface of the substrate (104) and is below the chip (102).

6. In reference to claims 3 and 4, Zhang makes it clear that the first (1002) and second (504) heat sinks can be made of a metal (p. 5, paragraph 81).

7. With regard to claim 5, figure 10 shows that the chip (102) is mounted and electrically connected to the upper surface of the substrate (104) by a plurality of bumps (902).

8. In reference to claim 6, there is an underfill material between the chip (102) and the substrate (104).

9. With regard to claim 7, there is a plurality of solder balls (106) disposed on the lower surface of the substrate (104) and around the second heat sink (504).

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zhang et al. (United States Patent Application No US 2002/0171144 A1) in view of Chiu (United States Patent Application No US 2003/00355269 A1).

12. In reference to claim 2, Zhang does not disclose the use of fins with the second heat sink. However the use of fins with a heat sink is well known in the art. Chiu (United States Patent Application No US 2003/00355269 A1) discloses that using fins with a heat sink allows better heat dissipation (p.2, paragraph 2) which is a known goal in the art (p.1, paragraph 5). In view of Chiu, it would therefore be obvious to use a heat sink with at least one fin in the device of Zhang.

13. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zhang et al. (United States Patent Application No US 2002/0171144 A1) in view of Mertol (USPN 5,909,056).

14. In reference to claim 8, Zhang does not disclose the use of an integrally formed heat sink and stiffener. However the use of an integrally formed heat sink and stiffener is well known in the art. Mertol (USPN 5,909,056) illustrates a device with an integrally formed heat sink and stiffener in figure 5. Mertol states that an integrally formed heat sink and stiffener has the advantage of saving time and expense during fabrication (column 6, lines 2-6). In view of Mertol, it would therefore be obvious to use an integrally formed heat sink and stiffener in the device of Zhang.

15. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zhang et al. (United States Patent Application No US 2002/0171144 A1).

16. With regard to claim 9, Zhang teaches all of the claimed invention except for the exact size of the heat sink. Although the Zhang device does not teach the exact size of the heat sink as that claimed by Applicant:

The shape, size, dimension differences are considered obvious design choices and are not patentable unless unobvious or unexpected results are obtained from these changes. It appears that these

changes produce no functional differences and therefore would have been obvious. Note *In re Leshin*, 125 USPQ 416.

Therefore claim 9 is not patentably distinguishable over the Zhang reference.

Allowable Subject Matter

17. Claims 10-15, 17, and 18 are allowed.

18. The following is a statement of reasons for the indication of allowable subject matter: the examiner is unaware of any prior art which suggests or renders obvious a chip package where the active surface of a chip is mounted to the upper surface of substrate (with the chip being electrically connected to the substrate) whereby a stiffener surrounds the chip and is also on the upper surface of the substrate while a first heat sink is on both the chip and the stiffener and a second heat sink is on the lower surface of the substrate such the second heat sink and the substrate have the same coefficient of thermal expansion.

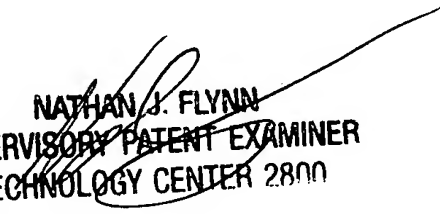
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin Quinto whose telephone number is (571) 272-1920. The examiner can normally be reached on M-F 8AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan Flynn can be reached on (571) 272-1915. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KVQ


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